What do we know about effective teaching?

Implications for Teacher Education

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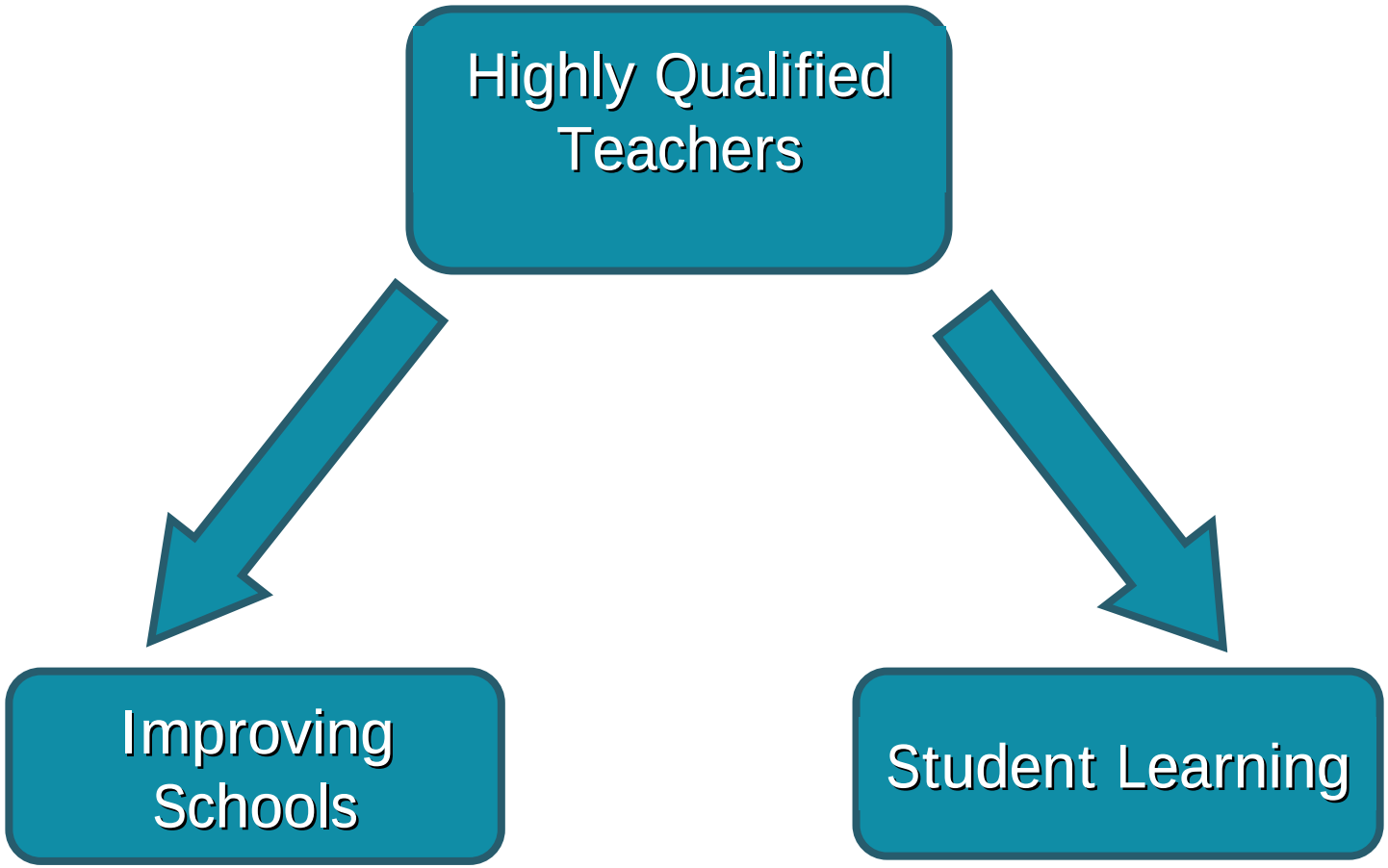
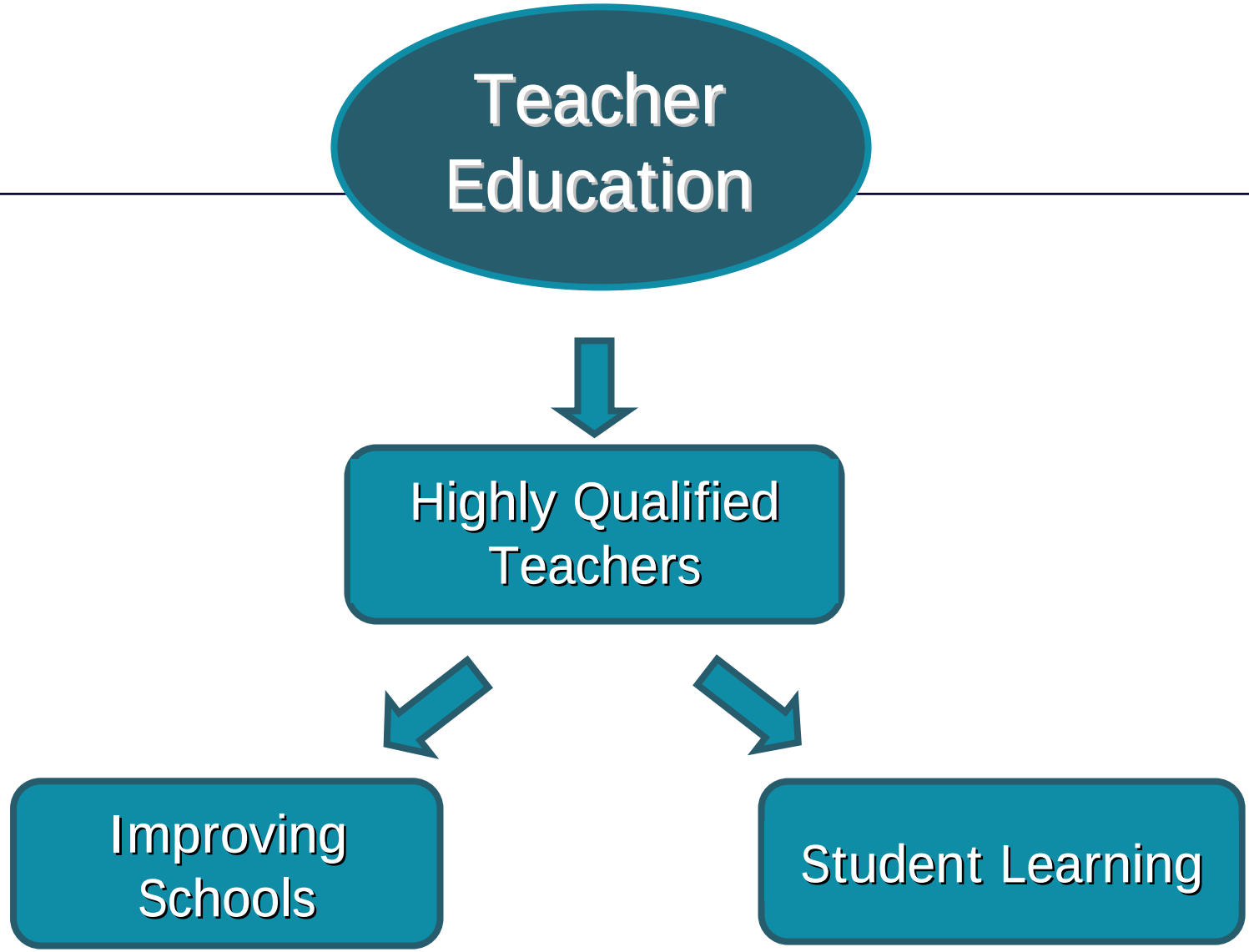
No Child Left Behind




Teacher Education
Highly Qualified Teachers
Improving Schools
Student Learning

The State of Teacher Education

- Teacher education is inadequate
- “Schools of education and formal teacher training programs are failing to produce the types of highly qualified teachers that the NCLB act demands” (USDE, 2002)
- The nation’s teacher education programs are inadequately preparing their graduates to meet the realities of today’s standards-based, accountability-driven classrooms, in which the primary measure of success is student achievement. (Levine, 2006)

MDE Teacher Preparation Policy Study Group

- The MDE Teacher Preparation Policy Initiative is intended to position the state of Michigan as a national model for development and implementation of coherent, policy for teacher preparation and quality that complements and advances rigorous and high expectations and standards at the K-12 level.
- Focus of first meeting:
  - What is an effective teacher?
  - How are effective teachers prepared?

Highly Qualified Teachers (*or* Effective Teachers)

- NCLB definition of "Highly Qualified Teachers"

A "highly qualified teacher" has full State certification, holds a license to teach, and meets the State's requirements. Depending on whether the teacher is in an elementary, middle school, or secondary school, the highly qualified teacher has a high degree of competency in all academic subjects taught. Existing teachers must have demonstrated competence in all the academic subjects taught, based on a high objective uniform State standard of evaluation. New teachers must hold at least a bachelor's degree and must pass a rigorous state test.

- Definition is highly contested

Research on Effective Teaching

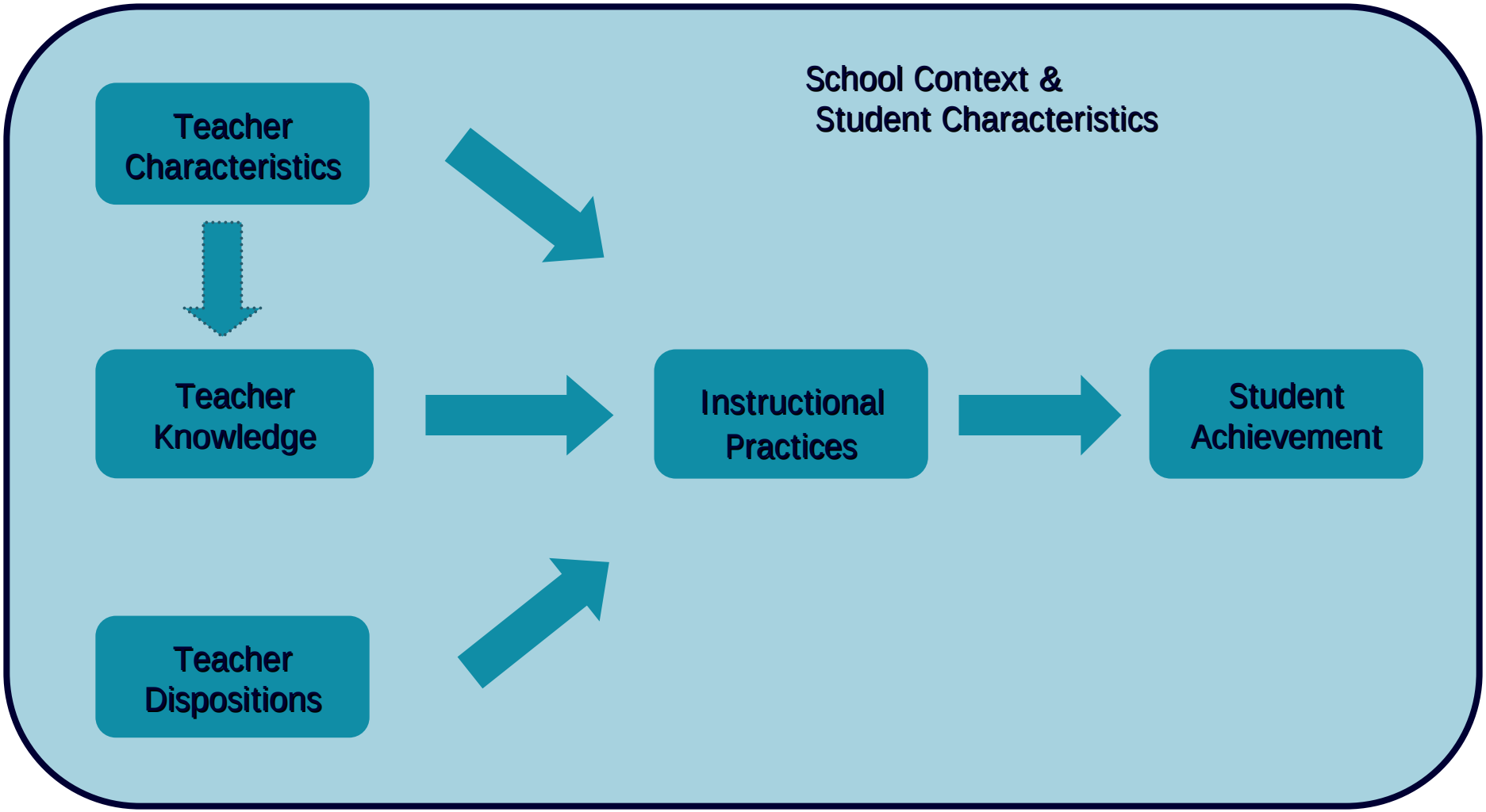
- Research is highly contested
  - Disagreement about what research “counts”
- Areas of contestation
  - Research design (genre)
  - Research outcomes
  - How findings are interpreted and synthesized

Research Outcomes: Building the Chain of Evidence

To get from teacher education to impact on pupils' learning requires a chain of evidence with several critical links: empirical evidence demonstrating the link between teacher preparation programs and teacher candidates' learning, empirical evidence demonstrating the link between teacher candidates' learning and their practices in actual classrooms, and empirical evidence demonstrating the link between graduates' practices and what and how much their pupils learn. Individually, each of these links is complex and challenging to estimate. When they are combined, the challenges are multiplied.

Marilyn Cochran-Smith, 2005, p. 303

A Possible "Chain of Evidence" in Research on Effective Teaching



What are characteristics (background experiences) of effective teachers?

- Status of college
- Test scores
- Degrees and coursework
- Certification status
- Years of experience

Subject Matter Preparation: An Example

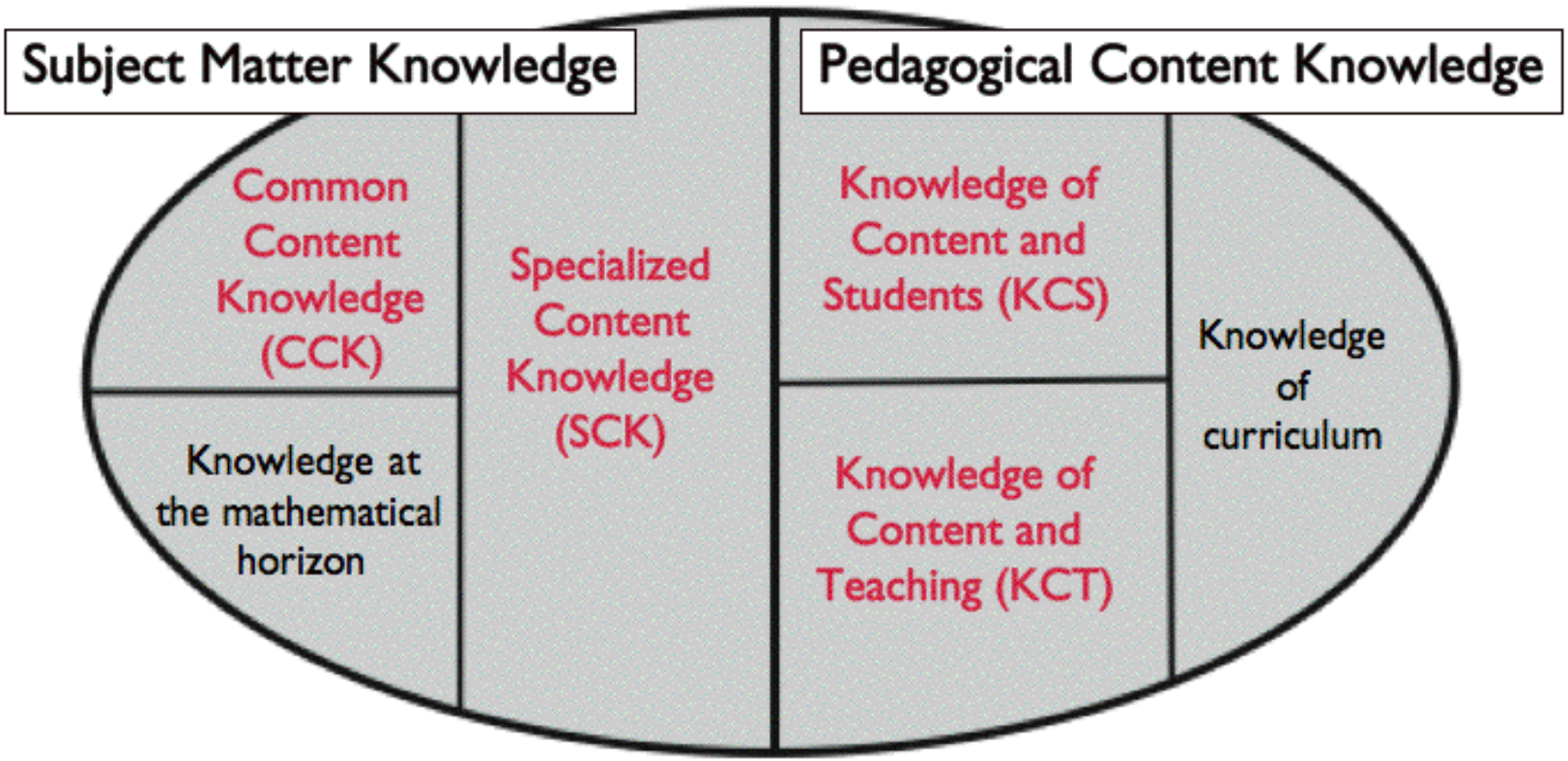
What is the relationship between teachers' study in subject areas and measures of teacher effectiveness?

- Nature of the research
  - Correlational studies: amount of college study with ratings of teacher performance or student achievement
  - Most in secondary mathematics
- Major findings
  - Positive effect of studying the subject
  - Some inconsistency

Subject Matter Preparation: Beyond the Reviews

- Possible reasons for limited findings
  - More sophisticated or nuanced questions
  - Subject matter knowledge for teaching
- Key question
  - What do effective teachers know?

Shulman's Original Category Scheme (1985) Compared with Ours



Ball, D. (2006). Shulman's original category scheme (1985) compared with ours. Presented by Deborah Ball, Hyman Bass, Laurie Sleep, & Mark Thames (March 10,2006) at the Eighth Annual Chicago Symposium Series on Excellence in Teaching Mathematics and Science: Research and Practice, Chicago, IL.

Mathematical Knowledge for Teaching: An Example

Student A	Student B	Student C
35 x25 125 +75 875	35 x25 175 +700 875	35 x25 25 150 100 +600 875

Which of these shows a method that could be used to multiply any two whole numbers?

Ball, D. (2006). Mathematical knowledge for teaching: An example using multiplication. For a discussion of this example, see: Ball, D. L., Hill, H.C, & Bass, H. (2005). "Knowing mathematics for teaching: Who knows mathematics well enough to teach third grade, and how can we decide?" *American Educator*. For a discussion of effects of such knowledge on student learning, see: Hill, H.C., Rowan, B., & Ball, D. (2005). "Effects of teachers' mathematical knowledge for teaching on student achievement." *American Educational Research Journal, 42* (2), 371- 406.

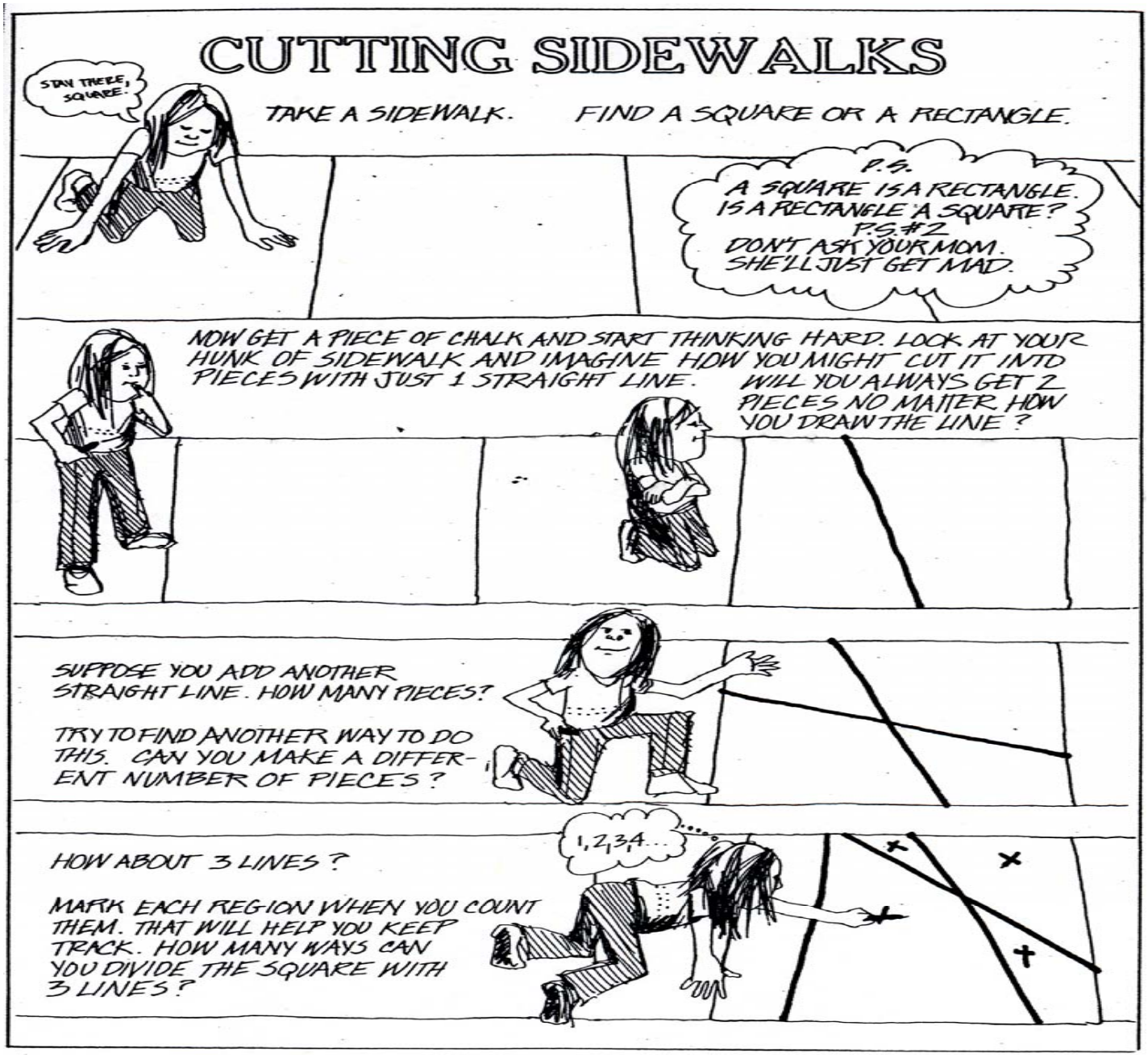
Supporting the Transition from Arithmetic to Algebraic Reasoning (STAAR)

University of Colorado Professional Development Research Team

- Hilda Borko
- Jeffrey Frykholm
- Karen Koellner
- Jennifer Jacobs
- Kim Bunning
- Eric Eiteljorg
- Mary Nelson
- Mary Pittman
- Craig Schneider

STAAR Summer Workshop:
Mathematics Knowledge for Teaching

- Mathematics tasks similar to middle school tasks
- Small group problem solving
- Whole group discussions
- Focus on extending content knowledge
  - Multiple representations and multiple solution strategies
  - Drawing connections among constructs


CUTTING SIDEWALKS
STAY THERE, SQUARE.
TAKE A SIDEWALK.
FIND A SQUARE OR A RECTANGLE.
P.S.
A SQUARE IS A RECTANGLE.
IS A RECTANGLE A SQUARE?
P.S.#2
DON'T ASK YOUR MOM.
SHE'LL JUST GET MAD.
NOW GET A PIECE OF CHALK AND START THINKING HARD. LOOK AT YOUR HUNK OF SIDEWALK AND IMAGINE HOW YOU MIGHT CUT IT INTO PIECES WITH JUST 1 STRAIGHT LINE.
WILL YOU ALWAYS GET 2 PIECES NO MATTER HOW YOU DRAW THE LINE?
SUPPOSE YOU ADD ANOTHER STRAIGHT LINE. HOW MANY PIECES?
TRY TO FIND ANOTHER WAY TO DO THIS. CAN YOU MAKE A DIFFERENT NUMBER OF PIECES?
1, 2, 3, 4...
HOW ABOUT 3 LINES?
MARK EACH REGION WHEN YOU COUNT THEM. THAT WILL HELP YOU KEEP TRACK. HOW MANY WAYS CAN YOU DIVIDE THE SQUARE WITH 3 LINES?

Teachers' Instructional Practices

- What do effective teachers do?
- Challenges of measuring instructional practices
- Drawing conclusions from the research
  - Instructional tasks
  - Classroom discourse
  - Learning environments
  - Classroom assessment

Instructional Tasks

- Effective teachers select, adapt, and/or create “worthwhile” instructional tasks
- Characteristics of tasks
  - Provide access to powerful ideas and practices in the discipline
  - Develop students’ skills and conceptual understanding
- Instructional practices
  - Decide which aspects of a task to highlight
  - Decide how to organize and orchestrate student work

Classroom Discourse

- Effective teachers orchestrate classroom discourse
- Teacher's role
  - Pose challenging questions
  - Listen to and build on student ideas
  - Decide when to provide information
- Student's role
  - Listen, respond and question
  - Make conjectures and present solutions

Learning Environments

- Effective teachers structure a learning environment that is supportive & challenging
- Environment that fosters each student's intellectual development
  - Structures time to enable exploring significant ideas & problems
  - Respects and values all students' ideas
- Environment that expects and encourages students to:
  - Take intellectual risks
  - Raise questions, formulate conjectures, support their ideas

Classroom Assessment

- Effective teachers assess students' understanding and use the evidence to inform their instructional practice
- Use a variety of formal and informal assessment strategies
- Analyze and monitor individual students' understanding
  - Use assessments to guide instructional decisions
  - Provide assessment information to students

Implications for Teacher Preparation: Initial Thoughts

What is the impact of pedagogical preparation on teachers' learning and professional practice?

- Nature of the research
  - Most studies: small observation studies
  - Difficult to generalize
- Overall conclusion
  - "cautious but positive" (Clift & Brady)
  - Impact on prospective teachers' thoughts and teaching practices

Pedagogical Preparation

- Shift from traditional views to an emphasis on active learning and teacher facilitation
- Difficulties translating concepts learned in methods courses into classroom practice
- Features of high-quality field experiences

The Problem-Solving Cycle